Addenda to the genus *Aporia* Hübner, [1819] (Lepidoptera: Pieridae)

Costantino Della Bruna, Enrico Gallo, Valerio Sbordoni and Gian Cristoforo Bozano

Dr. Costantino Della Bruna, Cas. Post. 51, I-20014 Nerviano, MI, Italy; dellabruna@alice.it
Dr. Enrico Gallo, Via Trento 5/20 D, I-16145 Genova, Italy
Prof. Dr. Valerio Sbordoni, Dpt. di Biologia, Università di Roma "Tor Vergata", Via della Ricerca Scientifica, I-00133 Roma, Italy; valerio.sbordoni@uniroma2.it
Ing. Gian Cristoforo Bozano, Viale Romagna 76, I-20133 Milano, Italy; giancristoforo.bozano@fastwebnet.it

Abstract: New data about the genus *Aporia*, achieved after the publication of the book Pieridae part 1 (Della Bruna et al. 2004), are here summarised. Many interesting taxa are discussed and illustrated: in particular the female of *A. lemoulti* Bernardi, 1944 and the male of *A. oberthuri cinerea* Della Bruna et al., 2003 are figured for the first time and the occurrence in Vietnam of *A. gigantea* is reported as new. Moreover two new synonymies are proposed: *A. martineti pallida* Kocman, 2004 **syn. n.** of *A. martineti konbogyandaensis* Yoshino, 1998 and *A. peloria wymanni* Ziegler, 2007 **syn. n.** of *A. peloria grayi* Bang-Haas, 1927.

Ergänzungen zur Gattung *Aporia* Hübner, [1819] (Lepidoptera: Pieridae)

Zusammenfassung: Neue Ergebnisse zur Gattung *Aporia,* die nach dem Erscheinen des Buchs Pieridae Teil 1 (Della Bruna et al. 2004) zugänglich wurden, werden hier zusammengefaßt. Verschiedene besonders interessante Taxa werden diskutiert und illustriert, darunter vor allem das Weibchen von *A. lemoulti* Bernardi, 1944 und das Männchen von *A. oberthuri cinerea* Della Bruna et al., 2003 werden erstmals abgebildet. Das Auftreten von *A. gigantea* in Vietnam wird als neu berichtet. Darüber hinaus werden zwei neue Synonymien vorgeschlagen: *A. martineti pallida* Kocman, 2004 **syn. n.** von *A. martineti konbogyandaensis* Yoshino, 1998 und *A. peloria wymanni* Ziegler, 2007 **syn. n.** von *A. peloria grayi* Bang-Haas, 1927.

Introduction

Over four years have passed since the publication of the Pieridae part 1, the 6th volume in the series "Guide to the butterflies of the Palearctic region" (Della Bruna et al. 2004, here indicated as "the Guide"), where we dealt with the taxa of the genus *Aporia* Hübner, [1819].

In this period several new data became available. First of all new field researches, performed mainly in China, produced very interesting material of both rare and extremely localised species and of previously unexplored localities. Moreover new sympatric occurrences between closely related species have been discovered and, in some taxa, specimens of the previously unknown sex have been found.

At systematic level some important changes have been proposed. The most recent researches on molecular phylogeny of the family Pieridae are clarifying the relationships among the various genera. In particular Braby et al. (2006) provided a more detailed classification of the tribe Pierini, and identified within it 5 lineages, one of which, the subtribe Aporiina, includes the genus *Aporia.* Moreover the taxa *Metaporia* Butler, 1870 and *Mesapia* Gray, 1856 are considered valid subgenera of *Aporia.*

We globally agree with these conclusions while we disagree with those authors who still use *Metaporia* at generic level and even in incorrect way. In fact the type species of *Metaporia* is *Pieris agathon* Gray, 1831, characterised in the ♂ genitalia by the uncus with a bifid apex. Many other species of *Aporia* share this character (Della Bruna et al. 2004) and only these must be included in the subgenus *Metaporia*. All the other species with a pointed uncus belong to the nominotypical subgenus *Aporia* whose type species, *Papilio crataegi* Linnaeus, 1758, displays this morphological character. The combination *Metaporia leucodice* (Eversmann, 1843), usually found in literature, is in particular incorrect, considering that the ♂ genitalia of *leucodice* are of the same type of those of *crataegi.*

Evidently these considerations are based mainly on morphological characters. MtDNA sequence analysis involving all the taxa of the genus will better clarify their relationships and consequently their correct subgeneric classification. One of us (Sbordoni) is working in this perspective and has investigated the relationships between the taxa *genestieri* Oberthür, 1902 and *genestieroides* Bernardi, 1962; the preliminary results of this research are given in this paper.

Annotated species list

Aporia (Aporia) martineti (Oberthür, 1884)

Kocman (2004) described ssp. *pallida,* based on a single specimen from Drigung Til, Lhasa region in E Tibet, 4500 m, overlooking ssp. *konbogyandaensis* Yoshino, 1998 whose type locality is Konbogyamda, Lhasa region in E Tibet.

Considering that the specimen figured by Kocman does not differ from the material of *konbogyandaensis* in our possession, we synonymise the two taxa and therefore *pallida* Kocman, 2004 must be considered a junior synonym of *konbogyandaensis* Yoshino, 1998, **syn. n.**

Aporia (Aporia) potanini Alphéraky, 1892

Yuan & Wu (2005) described the new subspecies *huanghaoi* from the area around Beijing.

Quoting the authors it differs from the other subspecies by the following characters: "both wings with ground colour white; forewing upperside with greyish-black apical spot obscure, terminal fascia and streaks on veins absent" (Fig. 1).

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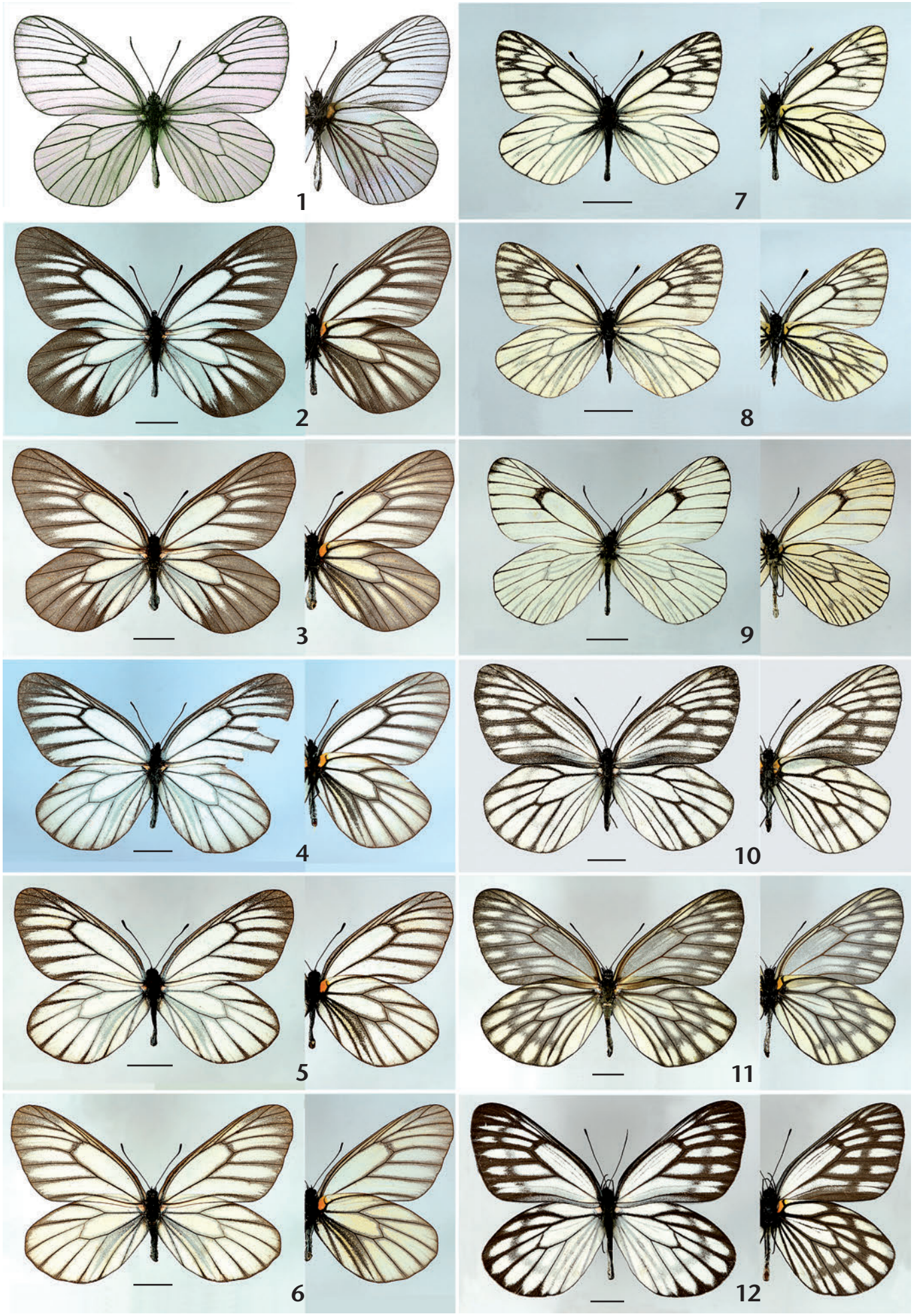

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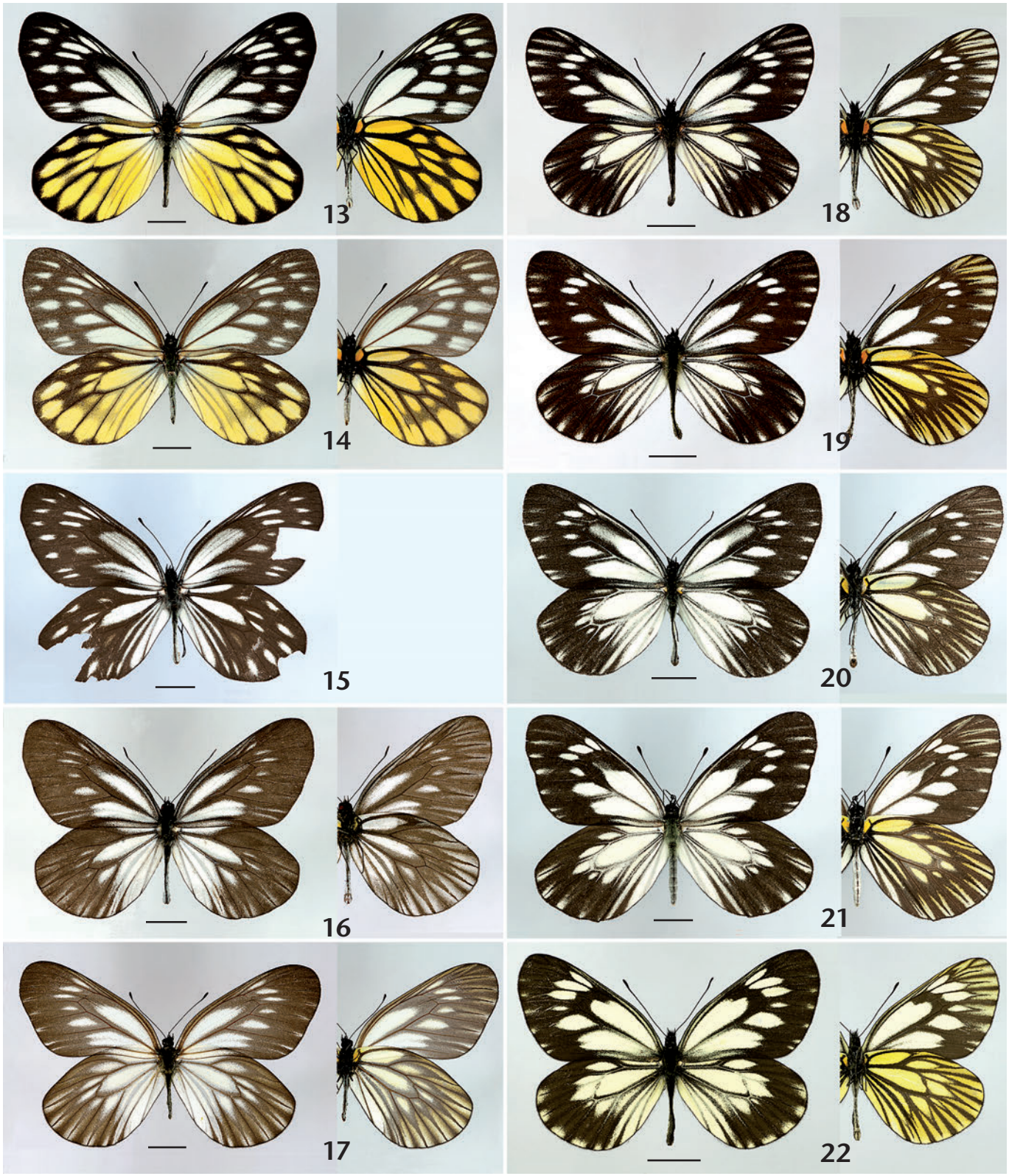

Colour plates. Always (except Fig. 15: upperside only) right: upperside, left: underside of the same specimen. — **Fig. 1:** *Aporia potanini huanghaoi*, ♂. China, Beijing, nearby the north gate of Wulingshan. **Fig. 2:** *Aporia genestieri genestieri,* ♂. Yunnan, Nujiang valley, Bingzhongluo vic., 1750 m. **Fig. 3:** *Aporia genestieri genestieri,* ♀. China, Yunnan, Nujiang valley, Bingzhongluo vic., 1750 m. **Fig. 4:** *Aporia genestieri genestieri* "light", ♂. China, Yunnan, Nujiang valley, Bingzhongluo vic., 1750 m. **Fig. 5:** *Aporia genestieri genestieroides,* ♂. China, Yunnan, pass between Nujiang and Mekong valleys, 2250 m. **Fig. 6:** *Aporia genestieri genestieroides,* ♀. China, Yunnan, pass between Nujiang and Mekong valleys, 2250 m. **Fig. 7:** *Aporia procris sinensis,* ♂. China, Qinghai, Sinin Alps, Lachzichan, 2000 m.**Fig. 8:** *Aporia procris sinensis,* ♀. China, Qinghai, Sinin Alps, Lachzichan, 2000 m. **Fig. 9:** *Aporia delavayi* from E Tibet, ♂. E Tibet, 20 km West of Tangmai, 2400–2600 m. **Fig. 10:** *Aporia largeteaui pacifica,* ♂. China, Zhejiang, Qingliangfeng Mts., 1000–1400 m. **Fig. 11:** *Aporia largeteaui pacifica,* ♀. China, Zhejiang, Qingliangfeng Mts., 1000–1400 m. **Fig. 12:** *Aporia gigantea,* ♂. NW Vietnam, Ha Giang Province. **Fig. 13:** *Aporia lemoulti,* ♂. China, Sichuan, Dechang–Puwei, 2150 m.**Fig. 14:** *Aporia lemoulti,* ♀. China, Sichuan, Dechang–Puwei, 2150 m. **Fig. 15:** *Aporia agathon,* ♂. China, S Sichuan, between Xichang and Dechang. **Fig. 16:** *Aporia oberthuri cinerea,* ♂. China, Sichuan, SW of Dujiangyan, road to Ji Guanshan, 1600 m. **Fig. 17:** *Aporia oberthuri cinerea,* ♀. China, Sichuan, SW of Dujiangyan, road to Ji Guanshan, 1600 m. **Fig. 18:** *Aporia harrietae harrietae,* ♂. Bhutan, Thimphu, Tangu Gompa, 2600 m. **Fig. 19:** *Aporia harrietae harrietae,* ♂. Bhutan, E of PeleLa, road to Trongsar, 2400 m. **Fig. 20:** *Aporia harrietae paracraea*, ♂. China, Yunnan, Mekong valley, Weixi vic. **Fig. 21:** *Aporia harrietae paracraea*, ♀. China, Yunnan, Mekong valley, Weixi vic. **Fig. 22:** *Aporia monbeigi,* ♂. China, Yunnan, Mekong valley, Weixi vic. — Scale bars 1 cm.

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This new discovered population is the easternmost end of a cline that through the intermediate subspecies *intercostata* Bang-Haas, 1927 arrives to the blackish nominotypical *potanini*.

Aporia (Aporia) genestieri (Oberthür, 1902)

When we published the Guide no specimens of the nominotypical subspecies were available to us, so we reproduced the figures from Verity (1911).

In summer 2004 during a naturalist research in the Salween (Nujiang = Lou-tse-kiang) valley in NW Yunnan, the type locality of *genestieri*, some specimens of this taxon were collected between the villages of Gongshan and Bingzhongluo (Figs. 2, 3). All the specimens were well characterised *genestieri,* i.e with extensive black markings, except 2 lighter worn ♂♂ collected at Bingzhongluo (Fig. 4). In the same region, on the mountain range dividing Salween and Mekong valleys, was found a lighter population belonging to the ssp. *genestieroides,* largely distributed in Yunnan and W Sichuan (Figs. 5, 6). Owing to the closeness of the two populations and the remarkable difference in their wing patterns at first we thought that taxa *genestieri* and *genestieroides* could be separate species. However, molecular work in progress addressed to clarify the phylogeny of *Aporia* species, did not highlight significant differences in the COI sequence of the mitochondrial DNA between the two forms (Deodati, pers. comm.). Therefore the almost sympatric occurrence of these two different forms in the Salween valley can be tentatively explained either by wing colour polymorphism, or by the occurrence of a contact zone between these two recently evolved subspecies.

Aporia (Aporia) procris Leech, 1890

We illustrate one couple of the ssp. *sinensis* (Bang-Haas, 1927) not shown in the Guide, coming from the type locality (Xining, Qinghai) (Figs. 7, 8). This subspecies is characterised by relatively reduced black markings and by greenish-white colour on the hindwing underside.

Aporia (Aporia) delavayi (Oberthür, 1890)

In the Guide we had tentatively assigned to the nominotypical subspecies the population of E Tibet. This attribution is not correct; in fact some new specimens collected in that region, between Nyingchi and Tangmai, appear to be slightly different having a larger and more evident black discal spot on the upperside of the forewings (Fig. 9).

Aporia (Metaporia) largeteaui (Oberthür, 1881)

We illustrate one pair of the ssp. *pacifica* (Mell, 1943) not shown in our previous work, originating from the Qingliangfeng Mts in the Zhejiang province (Figs. 10, 11).

Aporia (Metaporia) gigantea Koiwaya, 1993

This species has been found also in N Vietnam near the Yunnan border. This population seems to belong to the nominotypical subspecies (Fig. 12). As far as we know this is the first report from this country.

Aporia (Metaporia) lemoulti Bernardi, 1944

Of this beautiful species only few ♂♂ were previously known. In 2005 and 2006 some more specimens have been collected early in June near Dechang in S Sichuan, among which one ♀ that we illustrate for the first time together with a ♂ (Figs. 13, 14).

Bernardi (1944) described this taxon as subspecies of *A. agathon*. In the Guide (p. 50) we supposed that *lemoulti* and *agathon* could be sympatric; now we can confirm our assumption having found a ♂ of the latter in the above mentioned area (Fig. 15). This finding supports the specific status of *A. lemoulti.*

Aporia (Metaporia) oberthuri (Leech, 1890)

We described the ssp. *cinerea* on the basis of two worn ♀♀ collected near Wenchuan in Sichuan (Della Bruna et al. 2003).

Subsequently some more specimens were found in the same locality and, more southerly, in the vicinity of Dujiangyan. Among these findings there are some ♂♂ one of which we illustrate together with a freshly emerged ♀ (Figs. 16, 17).

Aporia (Metaporia) harrietae (de Nicéville, 1893)

This species was described from a single pair collected in Bhutan. The type material was deposited in the Natural History Museum of Calcutta. We tried to find this material but our efforts failed. Therefore we reproduced in the Guide the original figures of de Nicéville. Recently one of us visited Bhutan and collected some ♂♂ of the nominotypical subspecies. So we can now illustrate two of them (Figs. 18, 19). If further investigation will demonstrate that the type material has been lost the designation of a neotype will be possible if necessary.

Thanks to the availability of this fresh material we observed that the population from SE Tibet, named *baileyi* South, 1914, is very similar to nominotypical *harrietae,* with which it, very likely, should be synonymised.

In addition we observed that within the ssp. *paracraea* (de Nicéville, 1900) the specimens originating from the area of Weixi (NW Yunnan) are lighter than those living at Tse Kou (NW Yunnan, Mekong valley), the type locality of the taxon. Therefore it seems useful for comparison to illustrate a pair of the Weixi population (Figs. 20, 21).

Aporia (Metaporia) monbeigi (Oberthür, 1917)

Recent material of typical *monbeigi* collected in the Weixi area, where all the specimens share a more extensive white pattern, confirms our previous hypothesis that the original Oberthür series was not homogeneous including light and dark specimens certainly coming from different localities. In fact the dark specimen illustrated by him fits exactly ssp. *meiliensis* Yoshino, 1995, which lives more in

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the north in the Dêqên area. We illustrate a specimen from Weixi (Fig. 22); at this point it should be convenient to fix a lectotype from the Oberthür series, selecting one specimen corresponding to the Weixi population.

Aporia (Metaporia) kanekoi Koiwaya, 1989

Koiwaya (1989) had already reported the sympatry of this species and typical *A. larraldei* (Oberthür, 1876) in the area of Ya'an (Central Sichuan) where the two taxa are easily distinguishable. More in the north, near Wenchuan, *A. kanekoi* has been found flying together with A. *larraldei shizuyai* Koiwaya 1996; in this case, owing to the lighter wing pattern of the latter, the two species are less distinguishable and their identification requires more care.

Aporia (Mesapia) peloria (Hewitson, [1853])

Recently Ziegler (2007) published a revision of the taxa belonging to *Mesapia peloria*. In his paper the author describes the new ssp. *wymanni,* and re-establishes the ssp. *lama* Alphéraky, 1887, sinking in synonymy with it the ssp. *grayi* Bang-Haas, 1927. Moreover he synonymises with nominotypical *peloria* the sspp. *leechi* Bang-Haas, 1934 and *tibetensis* d'Abrera, 1991 not considering that the second synonymy was already established by us (Della Bruna et al. 2004).

The reasons supporting the above taxonomic arrangements are not completely clear, taking into account that the matter is particularly complex due to the vagueness of the geographical names used by the ancient authors. We could agree with the decision of synonymizing ssp. *leechi,* very similar to the nominotypical *peloria,* that we maintained valid due to its geographical isolation. We are less in accordance with Ziegler's opinion of re-establishing the validity of ssp. *lama* that already Alphéraky himself had synonymised with *peloria*. Similarly about the subspecies *grayi,* described from Gansu (Richthofen Mts.) (Bang-Haas 1927), which we still consider valid both for morphological characters and for its range. The taxon *wymanni* described by Ziegler from NW-Qilian-Shan (= Richthofen-Gebirge), for its features and location of its type locality, is regarded as a junior synonym of *grayi* Bang-Haas, **syn. n**.

However, an in-depth study on geographical variation of this widely distributed species is highly desirable.

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